Saskatchewan
Agriculture

Family Farm
Improvement Branch

Beef Cattle Handling Facilities

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Introduction

Cattle handling facilities are an essential part of any cattle operation. If well-built and functional, they contribute much to the easy, safe and rapid handling of cattle.

Good handling facilities need not be overly expensive. It pays to invest in quality for some of the critical areas such as pressure treated posts, a good squeeze and sturdy gates and latches.

Every cattleman's needs and situation are different. Some can build directly from plan leaflets, others will have to redesign the handling system to fit their farmsteads and individual requirements. Design assistance is available from the Saskatchewan Agriculture farmstead engineer.

Attention to the ways cattle react, and to the designs offered, will help make the operation more successful.

Cattle Behavior - Operator Response

Handling cattle will be much easier if livestock behavior is understood. For example, cattle have panoramic vision. Cattle can see all around without turning their heads. This affects their response to their environment and actions of the cattle handler. Other behavior and implications follow.

Herd Instinct

All species of livestock will follow the leader. This instinct is strong in cattle. The single file chute should be long enough to take advantage of this tendency.

The minimum length for a single file chute is 20 ft. (6 m). In larger facilities, 30 to 50 ft. (9 to 15 m) is recommended. Cattle, when isolated, can become agitated and stressed. When a lone animal refuses to move, the handler should release it from the crowding pen and bring it back with another group of cattle.

Response to Light

Cattle are fearful of harsh contrasts of light and dark around loading chutes, scales and working areas. Illumination should be uniform and there should be no sudden changes in floor level and texture.

Sunshades, if used over the working, loading and scale area, should be solid, not slatted. Slatted shades are fine for areas where the cattle live and feel familiar. However, when coming into handling areas, they are often nervous and may balk at a slotted sunshade. Cattle have a tendency to move towards the light. For example, when loading cattle at night, a frosted light inside the truck positioned so that it does not glare in their faces can help attract the cattle in. However, livestock will balk if they have to look directly into the sun. Loading chutes and squeeze chutes should face either north or south to maximize sun angle and minimize shadows.

Sometimes it is difficult to persuade cattle to enter a roofed working area, especially in bright sunlight. Balking will be reduced if the single file chute is extended 10 to 16 ft. (3 to 5 m) outside the building. Animals will enter more easily if they are lined up single file before they enter a dark building. The walls of the building should never be placed at the junction between the single file chute and the crowding pen.

A pattern of alternating light and dark causes cattle to balk, and they refuse to cross a shadow. Balking can also be caused by a small, bright spot in the chute. Handlers should be cautious about causing shadows.

Response to Movement

Cattle will balk if they see a moving or flapping object. Before moving or loading cattle, walk through the chute and check for obstructions at the cow's eye level. When cattle are being worked, handlers should stand back from the headgate so that the approaching animals cannot see them with their wide-angle vision. One animal that balks seems to spread its fear to the next animal in line. When an animal is being moved through a single file chute, do not frustrate the animal by prodding it before an opening can be seen as a place to go. A plastic garbage bag attached to a broom handle is a good tool for moving cattle in pens. The cattle move away from the rustling plastic.

When cattle are being moved, well-trained dogs are recommended for open areas and large pens. However, once the animals are confined in the crowding pen and single file chute, do not allow the dogs near the fences where they can bite the cattle.

The sides of the crowding pen, single file chute and loading chute should be solid. Solid sides prevent the animals from seeing people, equipment and other outside distractions. The funnel entrance from the crowding pen to the chute should have one continuous, straight wall, never a symmetrical funnel. The crowding pen gate works best with latch-stops at several points in its swing, to help move animals into the chute with little effort.

Cattle in a handling facility should be able to see other animals along the chute in front of them. Cattle will balk if a chute appears to be a dead end. Sliding and one-way gates in the single file chute must be constructed so that the animals can see through them.

Flight Zone

When a handler penetrates an animal's flight zone (Fig. 1), the animal will move away. If the handler penetrates the flight zone too deeply, the animals will either turn back and run past the handler, or break and run away. The best place for the handler to work is on the edge of the flight zone. This will cause the animal to move away in an orderly manner. The animal may stop moving when the handler retreats from the flight zone. The size of the flight zone varies, depending on the tameness or wildness of the animal. The flight zone radius for range cattle may be as much as 300 ft. (90 m), whereas that for feedlot cattle may be only 5 to 26 ft. (1.5 to 8 m).

The shaded area in Figure 1 shows the best position for moving an animal. To make the animal move forward, the handler moves into Position B which is just inside the boundary of the flight zone. The handler should retreat to Position A to cause the animal to stop. The solid curved lines indicate the location of the curved single file chute.

Many handlers make the mistake of getting too close to the cattle when driving them down an alley or putting them in a crowding pen. If the cattle attempt to rear up or turn back, the handler should back up and retreat from the animals' flight zone. During handling, minimize shouting to avoid enlarging the size of the zone.

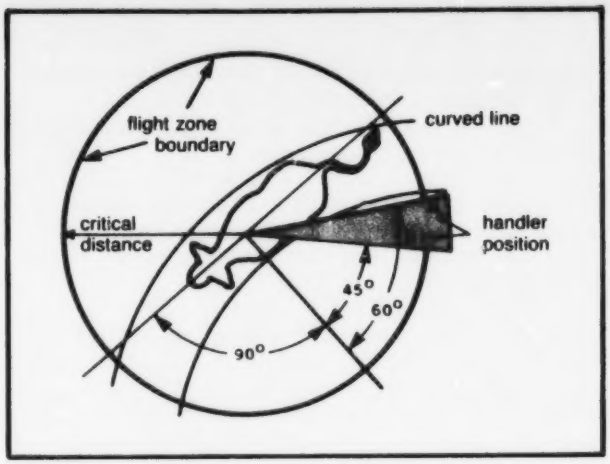

Figure 1. Flight zone

General Requirements

Dimensions

The recommended dimensions for beef cattle handling facilities are shown in Table 1. Safe handling practices for the operator and animals should be a result of these recommendations.

Table 1. Recommended dimensions for beef cattle corrals and handling facilities.

		Under 600 lb. (270 kg)	600-1200 lb. (270-540 kg)	Over 1200 lb. (540 kg)
Holding Area				
— Worked immediately	ft.² (m²) per	14 (1.4)	17 (1.7)	20 (2.0)
— Held overnight	animal	45 (4.5)	50 (5.0)	60 (6.0)
Working Chute w/Vertical Sides				
— Width	in. (mm)	18 (450)	22 (550)	28 (700)
— Desirable length (minimum)	ft. (m)	24 (7.2)		
Working Chute w/Sloping Sides				
— Width at bottom	in. (mm)	22 (550)		
— Width at 5 ft. (1.5 m) height	in. (mm)	32 (800)		
— Desirable length (minimum)	ft. (m)	24 (7.2)		
Working Chute & Feedlot Line Fences				
— Recommended minimum height	ft. (m)	5 (1.5)		
— Depth of posts in ground	ft. (m)	3 (1.0)		
Corrals and Bull Pen Fences				
— Recommended height	ft. (m)	6 (1.8)		
— Depth of posts in ground	ft. (m)	4 (1.2)		
Loading Chute				
— Width	in. (mm)	26 (650)	30-32 (750-800)	32 (800)
— Length (minimum)	ft. (m)	12 (3.6)		
— Rise	rise:run	1:4		
— Ramp height for:				
— gooseneck trailer	in. (mm)	15 (375)		
— pickup truck	in. (mm)	28 (700)		
— van-type truck	in. (mm)	40 (1000)		
— tractor trailer	in. (mm)	48 (1200)		
— double deck	in. (mm)	100 (2500)		
Access or Collecting Alley Width	ft. (m)	12 (3.6)		

Note: Cow-calf operations use dimensions for over 1200 lb. (540 kg)

Location and Drainage

The handling facilities should be accessible to all the pens. A well drained area should be chosen. A slope of approximately 2 percent away from the headgate and squeeze area will provide a dry area where most of the work is done on the cattle. A rough concrete pad in the chute and around the headgate prevents depressions from forming and gives cattle a solid footing.

Components of Handling Facilities

The following items, designs and construction features should be considered in planning a handling facility.

Corral, Fences and Gates

Strong fences and gates are essential. The posts should be pressure treated to prevent decay and placed a maximum of 8 ft. (2.4 m) apart. Feedlot fences should be four rails or 5 ft. (1.5 m) high. Corral fences should be five rails or 6 ft. (1.8 m) high (Fig. 2). Posts should be 8 ft. (2.4 m) long for the feedlot fences and 10 ft. (3 m) long for the corral fences. Curved fences encourage cattle to run along the fence. The cattle do not have the opportunity to bunch up in a corner as in a rectangular pen.

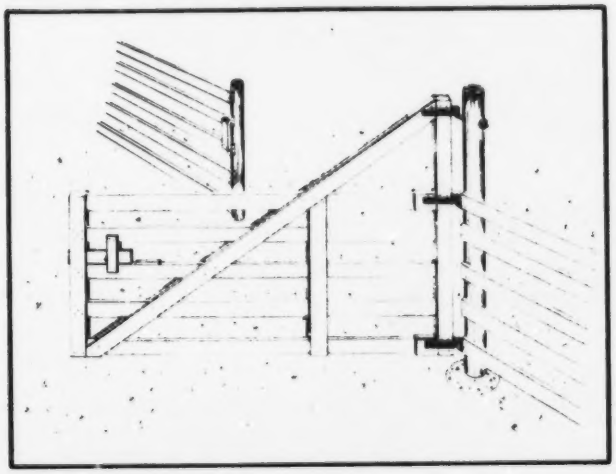

Figure 2. Corral and feedlot fencing - C.P.S. plan 1811

Collection Alley and Holding Pens

An access or collection alley about 12 ft. (3.6 m) wide is used to bring cattle from the barn, feedlot or pasture to the holding pen. At least one holding pen, sized to hold the herd, and preferably a second pen, are required to facilitate sorting. Allow about 20 ft.^{2} (2 m^2) per head for cattle to be worked immediately, and at least 60 ft.^{2} (6.0 m^2) for 1200 lb. (540 kg) cattle to be held for several hours. In the latter case, water and feed will also be required.

Crowding Gate

A good crowding gate is shown in Figure 3. The gate post is a 3 1/2 in. (90 mm) diameter pipe embedded in concrete. The gate is height adjustable for ease of gate swing when snow, ice and manure build up under the gate.

Solid crowding gates work best. This prevents the cattle from seeing through the gate.

Figure 3. Crowding gate - C.P.S. plan 1812

Working Chute

The distance from the catwalk platform to the top of the chute fence should be about 3 ft. (1 m). The chute side should be solid, not spaced planks or rails. Chute width and shape are critical. A straight sided chute 28 in (700 mm) wide is good for large animals. Two options for adapting to narrower chutes are:

- Install drop-in calf panels made from 4 x 8 ft. (1.2 x 2.4 m) sheets of plywood with 2 x 6 (38 x 140 mm) framing to reduce the chute width by 6 in. (150 mm).

- Build a tapered chute 22 in. (560 mm) wide at the floor and 32 in. (800 mm) at a height of 5 ft. (1.5 m).

There is some controversy about tapered chutes. A tapered chute adapts well to animals of varying sizes but can be a problem with range cattle or an animal that goes "down" or topples backwards. A concrete floor is desirable for chutes getting frequent use.

Working chutes (Fig. 4) should be 20 to 50 ft. (6 to 15 m) long. A working chute should be curved for two reasons. It prevents the animals from seeing the truck, the squeeze chute or people until they are almost in the truck or squeeze chute. A curved chute also takes advantage of the animals' natural tendency to circle around the handler.

Cattle can be driven most efficiently if the handler stays within the flight zone (Fig. 1). A well-designed, curved, single file chute has a catwalk for the handler along the inner curve. The curved chute forces the handler to stand at the best angle and lets the animals circle around him. The solid sides block out visual distractions except for the handler on the catwalk. The catwalk should run along the side of the chute, never overhead.

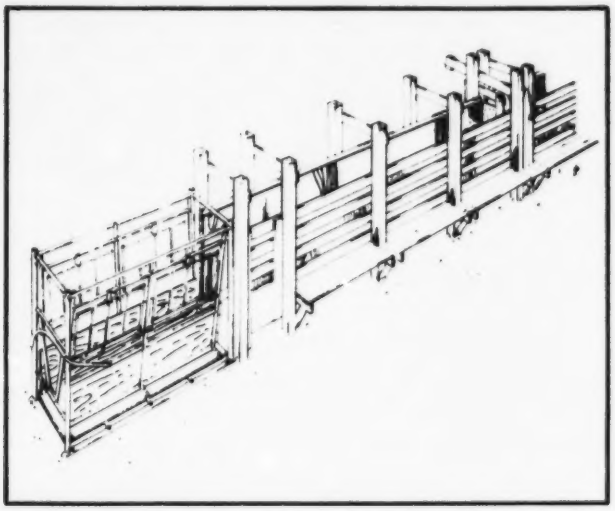

Figure 4. Working chute - C.P.S. plan 1813

Blocking Gates

Blocking gates are placed in the working chute at the entrance and where cattle must be stopped or prevented from backing up.

Two different designs are shown in Figure 5. One is a plywood covered gate running on rollers and track. It is inclined and self closing. The other is a plank gate running on a greased pipe.

Either gate can be constructed with openings or made solid by covering with plywood. The choice depends on whether the cattle are to move up to the gate and see ahead, or be shut off so they cannot see ahead as is the case with an A.I. chute.

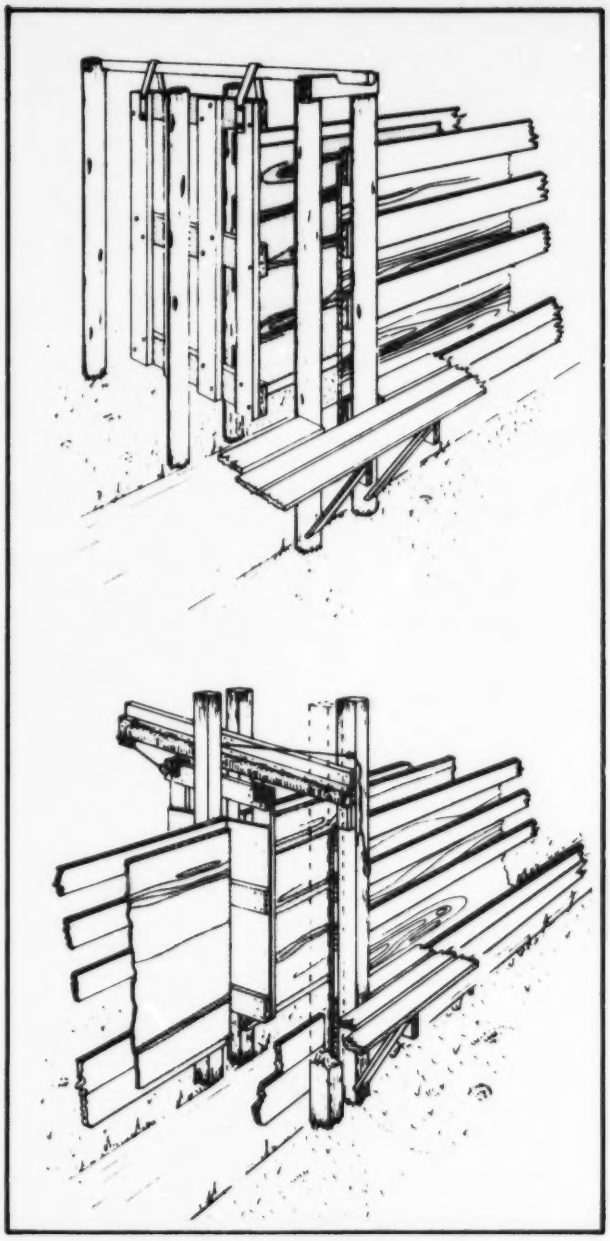

Figure 5. Blocking gates - C.P.S. plan 1814

Pregnancy Testing and A.I. Chute

The cows should be contained in dark boxes for artificial insemination (A.I.). For improved cattle conception rates, cows should be handled gently for A.I. and not allowed to become agitated or overheated. The chute used for A.I. should never be the same chute used for painful branding, dehorning or injections. Cows should not associate A.I. with pain. Cows can be easily restrained for A.I. or pregnancy testing in a dark box chute that has no headgate or squeeze. The dark box has solid sides, top and front. A cow in the box is inside a quiet, snug, dark enclosure and is restrained from behind. After insemination, the cow is released through a gate in the front of the chute.

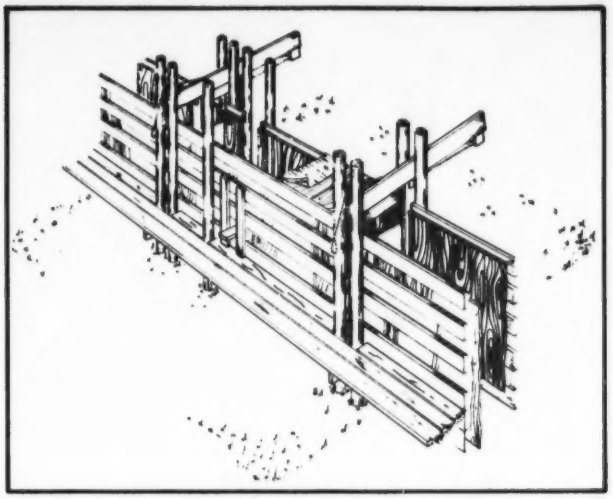

Figure 6. Pregnancy testing and A.I. chute - C.P.S. plan 1818

Figure 6 shows a chute designed specially for pregnancy testing and A.I. for beef cow herds.

Three cows can be brought into position at one time by closing the blocking gates and placing a cross rail behind each animal. After servicing, the blocking gates are opened and the cross rails removed. The three cows exit while three more are brought into the facility. This allows an even flow of cattle through the chute. The cross rails can be put at three different places to keep the cows from backing up. The choice of places is determined by the length of the animals being tested. Use solid blocking gates. A 13 in. (325 mm) opening in the chute lets a person enter safely behind the cow.

Select the number of cow positions and man openings in the chute according to the number of cows to be serviced and the time available.

For larger herds, consideration may be given to the herringbone design A.I. chute shown in Figure 7.

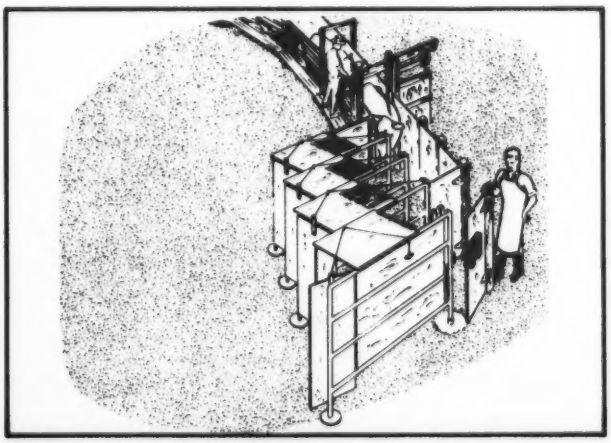

Figure 7. Herringbone A.I. breeding chute - C.P.S. plan 1819

Loading Chutes

The loading chute should be accessible by truck to an all-weather road. The producer can then take advantage of the market in buying and selling livestock at all times.

Loading chutes (Fig. 8 and 9) or a stepped, curved chute may be incorporated as part of the crowding pen, or located adjacent to the entrance to the main chute. Cattle load best if they go directly from the crowding pen rather than through a long working chute. A catwalk on one side of the chute will allow the handler to load cattle easier. Larger feedlots usually have loading ramps separate from the working chute. Though most farm loading chutes are 30 to 35 in. (750 to 875 mm) wide, some feedlot operators prefer 54 to 72 in. (1350 to 1800 mm) wide. Farm loading chutes need a height adjustment of 26 to 45 in. (650 to 1125 mm) or whatever height is required to match the floor height of the vehicle being loaded.

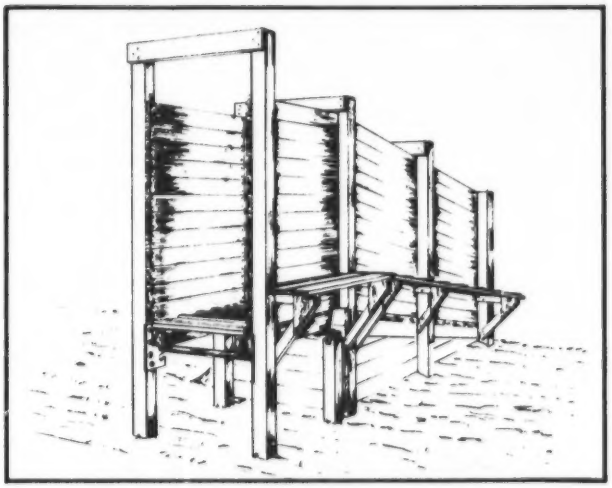

Figure 8. Stationary adjustable loading chute - C.P.S. plan 1816

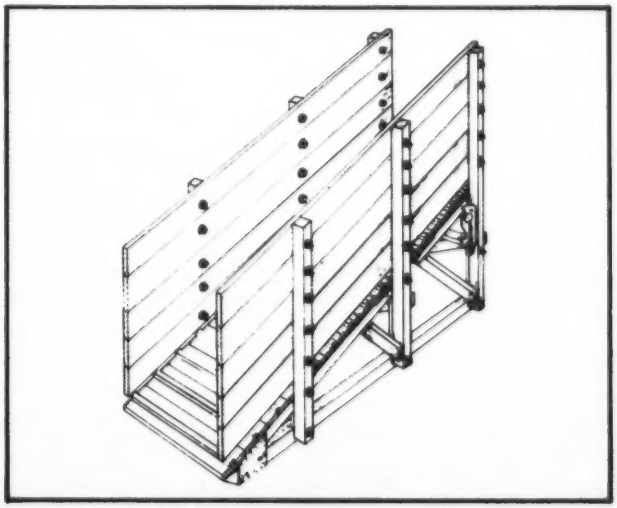

Figure 9. Adjustable loading chute - C.P.S. plan 1817

Loading chutes work better with telescoping side panels and with a self-aligning dock bumper (Fig. 10). These devices will help prevent foot and leg injuries caused by an animal stepping through a gap between the chute and truck. Adjustable side panels will prevent animals from jumping out the side gap between the chute and truck. A well-designed loading ramp has a level surface landing, about 5 ft. (1.5 m) wide to walk on or off the truck. The slope of a permanently installed cattle ramp should not exceed 20°. The slope of a portable or adjustable chute should not exceed 25°.

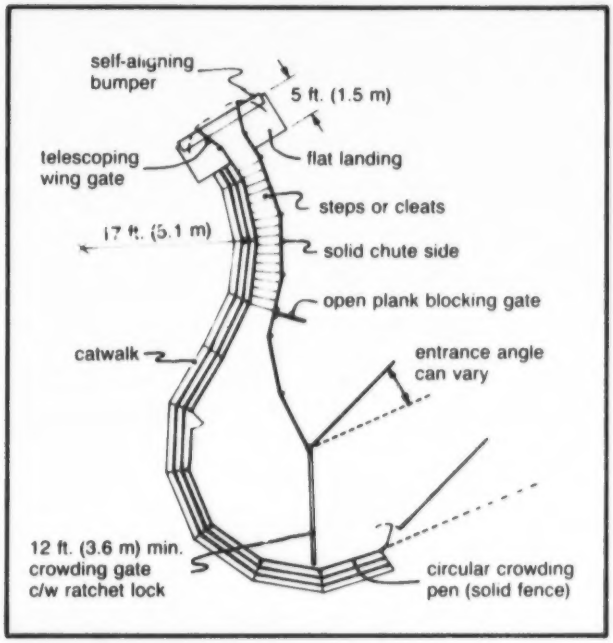

Figure 10. Curved loading chute with a circular crowding pen

Concrete ramps with stair steps are strongly recommended. For cattle, each step should have 3 1/2 to 4 in. (90 to 100 mm) rise and 12 in. (300 mm) tread width. The surface of the steps should be rough to provide good footing. On adjustable and wooden ramps, 1 x 2 (19 x 38 mm) hardwood cleats should be spaced 8 in. (200 mm) apart, measured edge-to-edge.

A wide, straight chute should not be used for loading cattle. Chutes for both loading and unloading cattle should have solid sides and a gradual curve. A curved, single file chute is most efficient for getting cattle to enter a truck or a squeeze chute. One used for loading and unloading cattle should have a radius of 12 to 17 ft. (3.6 to 5.1 m). The larger radius is best. A cattle loading chute should be 30 to 35 in. (750 to 875 mm) wide. For calves only, it should be 26 in. (650 mm) wide.

In auctions and meat packing plants where a chute is used to unload only, a straight chute 6 to 10 ft. (1.8 to 3 m) wide should be used. This provides the animals with a clear path to apparent freedom.

Headgates and Squeezes

Herd health care is virtually impossible without a headgate and/or a squeeze for restraining cattle. There are many headgates on the market and each of the four basic types are specially suited for certain handling procedures. The four basic types are:

- self-catcher
- scissors stanchion
- positive control
- full-opening stanchion

These are compared in Table 2.

Table 2. Types of manually operated headgates.

	Self-catcher	Scissors stanchion	Positive control	Full-opening stanchion
Recommended for	Hornless cattle, gentle cattle, one-man AI.	General purpose, big feedlots, wild cattle, minimum maintenance. Adjustable for cattle of mixed sizes.	Dehorning, wild cattle, horned cattle, big feedlots. Requires less strength to operate than stanchion gates; good head control.	General purpose, vet clinics, mixed cattle sizes (because the gate seldom needs adjustment). Large bulls can exit easily.
Not recommended for	Wild cattle, big feedlots, horned cattle, groups of mixed-size cattle (because the gate has to be readjusted to catch animals of different sizes).	Very large bulls (because they may have trouble exiting due to the narrow space between the two bottom pivots).	Vet clinics where the animal is held in the headgate for a prolonged time. AI and pregnancy testing are the primary uses of the headgate.	Big wild cattle, big feedlots (because many full-opening stanchion headgates are not sturdy enough to withstand constant heavy usage).
Warnings	Mechanism requires careful maintenance. Head and shoulder injuries may result if the animals are allowed to slam into the gate.	Be careful not to catch the animal's legs or knees between the two halves of the gate or the animal may be injured.	More likely to choke than a self-catcher, scissor, or full-opening stanchion.	Mechanism requires careful maintenance to prevent jamming. An excited animal may trip over the lower gate track.

Self-catcher, scissors stanchion, and full-opening stanchion headgates are available in models with either a straight or curved stanchion.

A small access gate at the rear of the squeeze, also serving to block the chute, makes work at the rear of an animal much easier.

The "V" shaped squeeze helps support the animal. The proper inside widths at the bottom of the squeeze sides are:

- 6 in. (150 mm) for 250 to 400 lb. (115 to 180 kg) calves

- 8 in. (200 mm) for 600 to 800 lb. (270 to 360 kg) animals

- 12 in. (300 mm) for cows and heavy feeders

- 14 to 16 in. (350 to 400 mm) for larger bulls

The best squeeze chutes have two sides that fold in evenly when the squeeze is applied.

Excessive squeeze pressure in a hydraulic chute can cause choking. A hydraulic chute is safe if the pressure relief valve is set correctly. Cattle can also be injured when a fast-moving animal is stopped suddenly by clamping the headgate around its neck. A skillful operator can adjust the squeeze to slow the animal down before it reaches the headgate.

Scales

Different types of scales are useful in various types of cattle handling operations. These can be for weighing a single animal or a group of animals. The single animal scale and scale cage (Fig. 11) can be most useful in determining the rate of gain and in selecting breeding stock or to determine how much weight bred cows are gaining or losing.

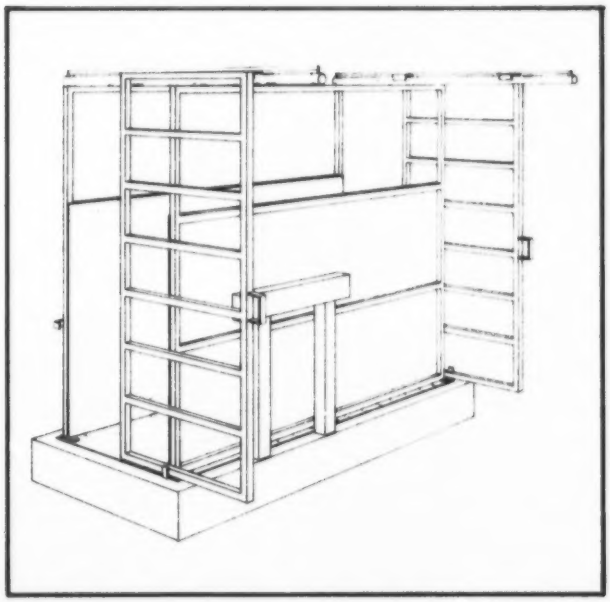

Figure 11. Single animal scale cage - FFIB plan S-181

The location of the scale must be adjacent to the working chute of the cattle handling facility. The scale can be offset from the main working chute (Fig. 13). Located in this manner, all animals worked in the chute and squeeze do not have to walk over the scale.

An animal should be fed and watered the same length of time prior to each time the animal is weighed.

The scale cage complete with floor, front and rear gate should be detached from the working chute. If either sides, front or rear gate are fixed and not weighed, an incorrect weight will be recorded if the animal leans on the side or gate while being weighed.

A cage insert or moveable cage side can be used to keep a calf from turning around in the cage.

Most larger feedlots require group animal scales. These are also connected to but set off from the main working chute and squeeze. These scales are usually read from the inside of a building.

Additional Features

In addition to the basic pen-chute-squeeze unit, there are a number of additional features that can improve cattle handling facilities. These features are:

- additional sorting pens

- loading chute separate from the working chute and corral, particularly desirable for larger feedlots

- concrete paving of chute and crowding pen floors

- electrical service and lighting at the chute

- cutting gate, located part way along the chute for releasing individual animals

- covered squeeze and chute for all-weather operation

- a tipping table for trimming and other operations

- water and feed in overnight holding pens

- man passages at critical locations in corral fences

Corral Arrangements

Some slope is required for drainage, but the floor should slope no more than 2 percent. Otherwise, cattle may pile up against the gate in the crowding pen. Livestock move more easily uphill than down, but they move most easily on a flat surface.

Minimum Working Corral

An inexpensive minimum working corral can save many frustrating hours of work when handling cattle (Fig. 12). A minimum working corral should have an access or collecting alley about 12 ft. (3.6 m) wide to bring cattle from the barn, feedlot or pasture to the holding pen. There should be at least one holding pen sized to hold the herd and preferably a second pen for sorting. A crowding pen and gate are essential to force cattle into the working chute. Preferably, an adjustable loading chute should be located for easy year-round access. As the herd or operator's needs increase, this layout can be readily expanded by adding onto the working chute and adding more pens. Solid sides should be used for the crowding pen, working chute and loading chute.

Figure 12. Minimum working corral - C.P.S. plan 1831

Curved Chute Corral

Figure 13 shows a handling facility for a cow-calf operation which is adaptable to feedlot operations. A loading chute, squeeze, headgate, and scale is incorporated into this facility.

The curved, tapered chute has proven to be an effective method for moving cattle. It can handle all sizes of cattle from mature cows to 400 lb. (180 kg) calves. At the headgate exit it is possible to sort in four different directions.

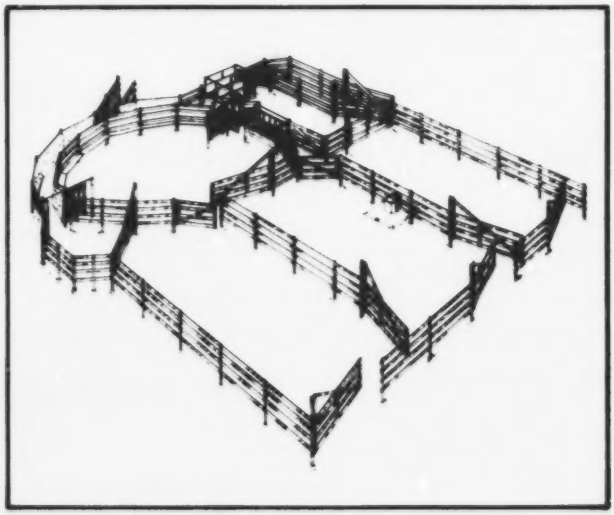

Figure 13. Curved chute corral - FFIB plan S-185

The loading chute can be located anywhere along the curved working chute.

Six inch (150 mm) top diameter pressure treated posts 8 ft. (2.4 m) long are placed at 8 ft. (2.4 m) centers on the outside radius for both wedged and straight wall chutes. For narrowing the inside width of a straight wall chute for handling young cattle, filler panels can be used.

The catwalk is placed to help inspection, treatment, and prodding of animals moving through the chute.

By-pass Curved Chute

Figure 14 illustrates a handling facility for large feedlots where there is a high through-put of animals many times a year. Consideration should be given to covering the facility if there is high through-put during cold weather. If covered, a heated office with a sliding window could be constructed adjacent to the scale location.

The illustrated by-pass curved chute facility features the following:

- three crowding gates on one post to crowd cattle from the entrance alley into the working chute, as well as from the working chute or scale cage back to the exit alley

- gates in the working chute to direct cattle into the squeeze or to by-pass it

- gates in the working chute to direct cattle into the scale cage or to by-pass it

- gates to direct cattle into either of the two loading chutes

- cattle can move either way through the chute.

- one loading chute at ground level and one adjustable height loading chute

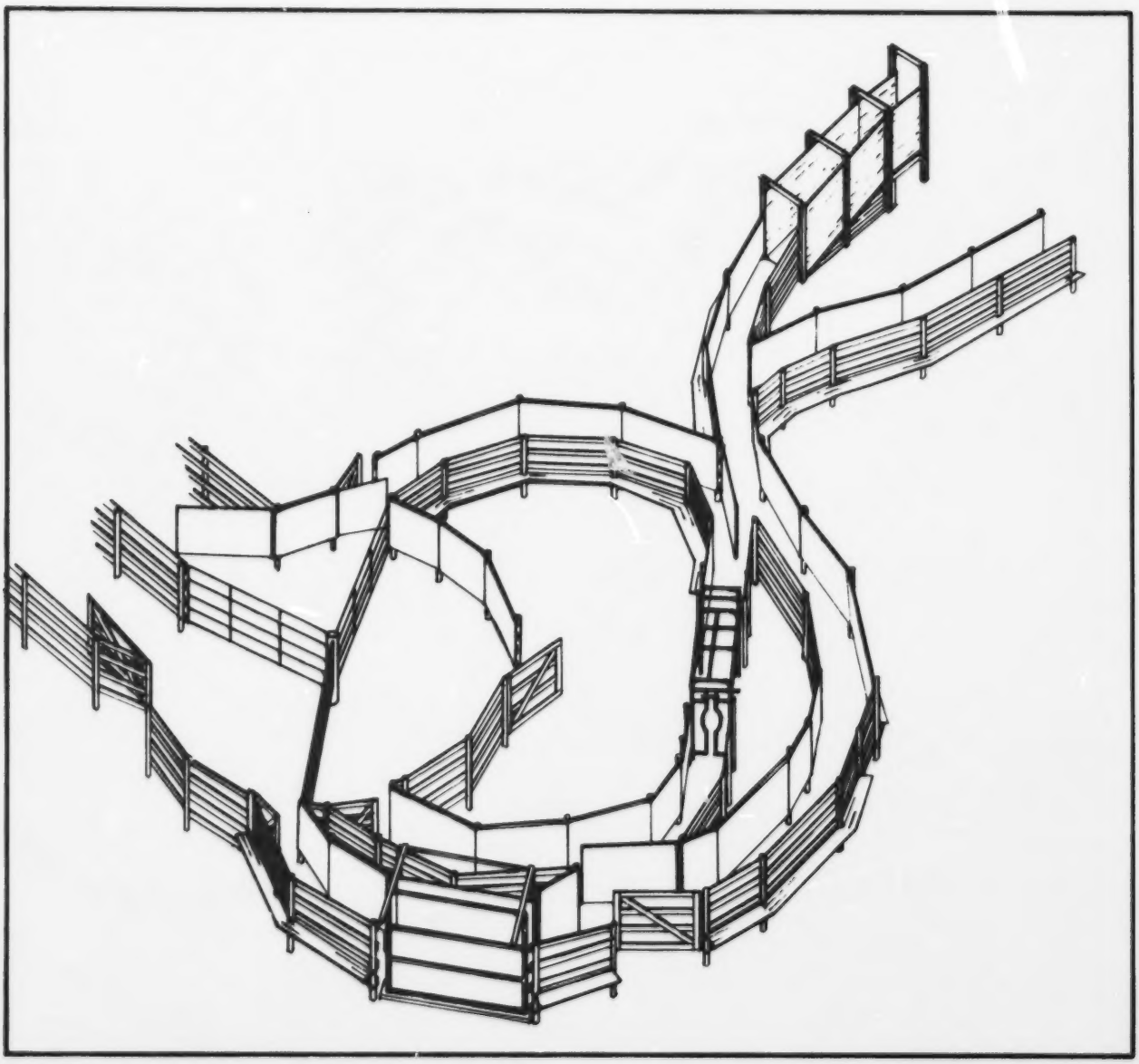

Figure 14. By-pass curved chute - FFIB plan S-188

Acknowledgements

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